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ABSTRACT

Presented are student performance objectives, a student progress chart, and assignment sheets with cbjective and diagnostic measures for the stated performance objectives in college arithmetic. Topics covered include: whole numbers, decimal fractions, fractions, ratio and proportion, percent, powers and roots, and the metric system of measurement. (MK)

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COLLEGE ARITHMETIC

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SE 029 345

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INTRODUCTION

During the Summer of 1974 criterion-referenced diagnostic tests were written for college arithmetic and college algebra. The materials included herewith are student performance objectives, student progress chart, assignment sheets/objective and diagnostic measures for each objective.

The materials were prepared for use at specific colleges in the 1974-75 school year and were so named to match the college numbering system.

College Arithmetic is the same as Math 60.

College Arithmetic and Pre-Algebra is the same as Math 50.

College Algebra I is the same as Math A.

College Algebra II is the same as Math D.

OBJECTIVES

MATHEMATICS 60

OBJECTIVES

1. WHOLE NUMBERS.

   1.1 PLACE VALUE. Given a numeral of not more than 6 digits the student will:

   a. identify the place value of each digit.

   b. read and write the numeral in words.

   c. write the numeral.

   1.2 NUMBER PROPERTIES. Given examples of the application of the commutative, associative, and distributive properties, the student will identify the particular property used.

   1.3 PROPERTIES OF ONE AND ZERO. Given examples of the application of the sums, products, or quotients involving the numerals zero and one, the student will correctly perform the indicated operation.

2. WHOLE NUMBERS.

   2.1 ADDITION. The student will correctly add five whole numbers given in vertical or horizontal form with at most six digits in each number.

   2.2 SUBTRACTION. The student will correctly subtract two five-digit whole numbers with at least one zero in the minuend.

2.3 MULTIPLICATION. The student will correctly multiply a four-digit whole number by a three-digit whole number.

2.4 DIVISION. The student will determine the quotient of two whole numbers, write a remainder if necessary, and comprehend that division by zero is impossible.

2.5 ORDER OF OPERATIONS. Given an expression written without symbols of inclusion involving indicated addition, subtraction, multiplication, and division, the student will evaluate the expression.

3. DECIMAL FRACTIONS.

3.1 ROUNDING OFF. Given a decimal fraction with not more than five digits, the student will round the number to the designated accuracy.

3.2 ADDITION. Given five decimal fractions with at most six digits in a horizontal or vertical form, the student will determine their sum.

3.3 SUBTRACTION. Given two decimal fractions of at most four digits, the student will correctly subtract them.

3.4 MULTIPLICATION. Given at most three decimal fractions with not more than three decimal digits in each, the student will correctly determine their product.

3.5 DIVISION. The student will correctly divide a four-digit number by a two-digit number and round the quotient to the indicated accuracy.

3.6 SCIENTIFIC NOTATION. Given any decimal fractions, the student will write the numeral in correct scientific notation form.

4. FRACTIONS.

4.1 PRIME AND COMPOSITE NUMBERS. Given any whole number less than 5,000, the student will identify the number as prime or composite, and if composite, write the number into prime factoral form.

4.2 INTRODUCTION TO FRACTIONS. Given a fraction, the student will correctly identify:

a. the numerator and denominator.

b. the fraction as being proper, improper, or mixed.

Also, the student will change a mixed number into an improper fraction.

4.3 LEAST COMMON MULTIPLE AND GREATEST COMMON DIVISOR. Given not more than three numerals, the student will correctly determine their least common multiple, greatest common divisor, or, if possible, lowest common denominator.

4.4 ORDERING OF FRACTIONS. Given two or more fractions with unlike denominators, the student will:

a. classify into ascending order, and

b. compare with inequality symbols.

Also, the student will write any fraction into an equivalent fraction with indicated denominator.

4.5 ADDITION. Given two or more fractions or mixed numbers with unlike denominators, the student will correctly determine their sum in reduced form.

4.6 SUBTRACTION. Given two mixed numbers, the student will correctly subtract and write the difference in reduced terms.

4.7 MULTIPLICATION. Given a common fraction, mixed number, or whole number, the student will correctly determine its product with a combination of common fractions, mixed numbers, and whole numbers, and write the product in lowest terms.

4.8 DIVISION. Given a common fraction, mixed number, or whole number, the student will correctly divide the numeral with a common fraction, mixed number, or whole number and write the quotient in reduced terms.

5. RATIO AND PROPORTION

5.1 RATIO. The student will indicate the comparison of two numbers as a ratio.

5.2 PROPORTION. Given two ratios with one unknown, the student will determine the missing term.

6. PERCENT

6.1 RELATIONSHIP TO DECIMAL FRACTIONS. Given a whole number, decimal, or percent, the student will correctly change the numeral into an equivalent whole number, decimal, or percent as indicated and write in reduced form.

6.2 RELATIONSHIP TO COMMON FRACTIONS. The student will correctly change a percent into an equivalent common fraction and a common fraction into an equivalent percent.

6.3 APPLICATIONS. Given two parts of a percent, rate, base problem, the student will correctly determine the third term.

7. POWERS AND ROOTS

7.1 POWERS OF NUMBERS. Given a numeral in exponential form, the student will correctly evaluate the numeral.

7.2 PERFECT SQUARES. The student will indicate the square root of any number less than 401 that is a perfect square.

7.3 USE OF TABLES. The student will correctly determine the square root of any integer less than or equal to 400 by the use of square root tables.

8. METRIC SYSTEM OF MEASUREMENT

8.1 VOCABULARY. The student will match the metric prefixes with their numeral meanings.

8.2 LENGTH. Given a table of metric measurements, the student will make linear metric conversions.

8.3 VOLUME (CAPACITY). Given a table of metric measurements, the student will make metric capacity conversions.

8.4 MASS. Given a table of metric measurements, the student will make metric mass conversions.

8.5 AREA. The student will solve practical applications problems working within the metric system.

STUDENT PROGRESS CHART

MATH 60

STUDENT PROGRESS CHART

KERN COMMUNITY COLLEGE DISTRICT

STUDENT'S NAME

whole numbers								decimals						fractions									percent				metric			
1.1 Place Value	1.2 Number Properties	1.3 One and Zero	2.1 Addition	2.2 Subtraction	2.3 Multiplication	2.4 Division	2.5 Order of Operations	3.1 Rounding Off	3.2 Addition	3.3 Subtraction	3.4 Multiplication	3.5 Division	3.6 Scientific Notation	4.1 Prime - Composites	4.2 Introduction	4.3 Least Common Multiple	4.4 Ordering	4.5 Addition	4.6 Subtraction	4.7 Multiplication	4.8 Division	5.1 Ratio	5.2 Proportion	6.1 Decimal Fractions	6.2 Common Fractions	6.3 Applications	7.1 Powers of Numbers	7.2 Perfect Squares	7.3 Use of Tables	8.1 Vocabulary	8.2 Length	8.3 Volume	8.4 Mass

TABLE OF CONTENTS

MATHEMATICS 60

PRETESTS

Table of Contents

1. WHOLE NUMBERS

1.1 Place Value

1.2 Number Properties

1.3 Properties of One and Zero

2. WHOLE NUMBERS

2.1 Addition

2.2 Subtraction

2.3 Multiplication

2.4 Division

2.5 Order of Operations

3. DECIMAL FRACTIONS

3.1 Rounding Off

3.2 Addition

3.3 Subtraction

3.4 Multiplication

3.5 Division

3.6 Scientific Notation

Table of Contents

4. FRACTIONS

4.1 Prime and Composite Numbers

4.2 Introduction to Fractions

4.3 Least Common Multiple and Greatest Common Divisor

4.4 Ordering of Fractions

4.5 Addition

4.6 Subtraction

4.7 Multiplication

4.8 Division

5. RATIO AND PROPORTION

5.1 Ratio

5.2 Proportion

6. PERCENT

6.1 Relationship to Decimal Fractions

6.2 Relationship to Common Fractions

6.3 Applications

7. POWERS AND ROOTS

7.1 Powers of Numbers

7.2 Perfect Squares

7.3 Use of Tables

Table of Contents

8. METRIC SYSTEM OF MEASUREMENT

8.1 Vocabulary (included in module)

8.2 Length

8.3 Volume (Capacity)

8.4 Mass

8.5 Area

UNIT TESTS

TOPIC 60-1.1

PLACE VALUE

OBJECTIVES:

- To read numerals representing whole numbers.

  Example: 67 = sixty seven

- To write numerals representing whole numbers.

  Example: fifteen = 15

A.

1. Copy and write in words the name for each of the following numerals.

   (a) 5050 (b) 9806

2. Copy and write the numeral for each of the following whole numbers.

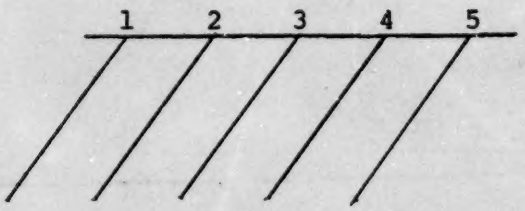
   (a) three hundred, six

   (b) forty thousand, two hundred, eight

3. What is the place value of the digit 9 in the numeral 8921?
4. Using only the digits 3 and 0, write a numeral where the 3 appears only in the thousandth's place and the unit's place.
5. Copy the numeral 46,582 and circle the digit whose place value is 10 times greater than the place value of the digit 8.

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

B. Copy and name the place value of each of the digits in the number 12,345.



TOPIC 60-1.2

NUMBER PROPERTIES

OBJECTIVE:

● To identify the associative, commutative, and distributive properties.

A. Copy and match the letter of the properties in the right column with the number in the left column.

_____ 1. $2 + 3 = 3 + 2$	a.	Associative Property of Addition
_____ 2. $3 \times 4 = 4 \times 3$	b.	Associative Property of Multiplication
_____ 3. $2 \times (3 + 5) = 2 \times 3 + 2 \times 5$	c.	Commutative Property of Addition
_____ 4. $2 \times (3 \times 4) = (2 \times 3) \times 4$	d.	Commutative Property of Multiplication
_____ 5. $3 \times (4 \times 2) = (4 \times 2) \times 3$	e.	Distributive Property

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-1.3

PROPERTIES OF ONE AND ZERO

OBJECTIVES:

- To write the sum of zero and any number.
- To write the product of zero and any number.
- To write the product of one and any number.
- To write the quotient of any number and one.
- To recognize the relationship of any number divided by zero.

A. Copy and perform the sum or product as indicated.

1. 1×5	2. 0×5
3. $1 + 3$	4. $3 + 0$
5. 1×0	6. $0 + 0$
7. 0×0	8. 100×1
9. $10 \div 1$	10. $8 \div 0$

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-2.1

WHOLE NUMBERS: ADDITION

OBJECTIVE:

- To add whole numbers.

  Example: 5452 + 809 = 6261

A. Copy and perform the following additions.

1.
$$\begin{array}{r} 3456 \\ 2139 \\ \underline{5926} \end{array}$$

2.
$$\begin{array}{r} 21 \\ 392 \\ \underline{4892} \end{array}$$

3. 1 + 10 + 100 + 1000 + 10000

4. 34962 + 26 + 389 + 5647 + 8

5. Determine the sum of whole numbers greater than 997 but less than 1003.

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 30-2.1

B. Copy and add.

1.	2.	3.	4.
23	724	4826	34672
46	893	5956	81934
	644	8062	67520
		8891	83908
			64991

C. Copy and add.

1. 4 + 23 + 349 + 5962
2. 10001 + 2002 + 11010 + 303
3. 68829 + 465031 + 654392 + 80962
4. 1000000 + 100000 + 10000 + 1000 + 100

D. Answer the following.

1. What is the sum of all whole numbers between 10 and 20?
2. What is the sum of the first four whole numbers?
3. What is the sum of whole numbers greater than 46 but less than 50?
4. What is the sum of whole numbers less than 98 but greater than 88?

TOPIC 60-2.2

WHOLE NUMBERS: SUBTRACTION

OBJECTIVE:

- To subtract whole numbers.

  Example: 5962 - 391 = 5571

A. Copy and perform the following subtractions.

1. 432 - 98
2. 3843 - 1933
3. Subtract 349 from 1024.
4. What is 64 less than 100?
5. A family's total monthly income is $798. Their total bills amount to $389. How much is left after paying the bills?

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-2.2

B. Copy and subtract.

1.	2.	3.	4.
68	394	3802	98640
-49	-162	-1684	- 9864

C. Copy and subtract.

1. 3456 - 1234
2. 900 - 646
3. 10562 - 1056
4. 86004 - 68906

D. Copy and solve as indicated.

1. Subtract 3000 from 9684.
2. Subtract 284 from 821.
3. What number is 10 less than 92?
4. What is 394 less than 1000?
5. What is the difference between 34 and 82?

TOPIC 60-2.3

WHOLE NUMBERS: MULTIPLICATION

OBJECTIVE:

- To multiply whole numbers.

  Example: $34 \times 8 = 272$

A. Copy and perform the following multiplications.

1. $\begin{array}{r} 346 \\ \times\ \ 8 \\ \hline \end{array}$

2. 2645×206

3. $25 \times 4 \times 1$

4. $10 \times 5 \times 0$

5. If Carl's water bill is $7.46 per month, how much will he pay in twelve months?

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC

TOPIC 60-2.3

B. Copy and multiply.

1. 356×22
2. $8 \times 9 \times 10$
3. $3842 \times 10 \times 10$
4. 691×691

C. Copy and multiply.

1. $\begin{array}{r} 34 \\ \times\ 6 \\ \hline \end{array}$
2. $\begin{array}{r} 6402 \\ \times\ 13 \\ \hline \end{array}$
3. $\begin{array}{r} 3456 \\ \times\ 501 \\ \hline \end{array}$
4. $\begin{array}{r} 9431 \\ \times\ 100 \\ \hline \end{array}$

D. Copy and solve as indicated.

1. What is the product of 1 and 98?
2. What is the product of the first 5 whole numbers?
3. What is zero multiplied by 394?

TOPIC 60-2.4

WHOLE NUMBERS: DIVISION

OBJECTIVES:

- To perform long division where the divisor contains two or more digits.
- To show that division by 0 is impossible.
- To indicate a quotient with the correct remainder.

A. Copy and perform the following divisions.

1. $384 \div 12$
2. $8 \div 0$
3. $13\overline{)8492}$
4. Divide 38941 by 19
5. Maria bought a hi-fi set and the total charge was $962.80 including financing. What would be the monthly payments if she paid it off in one year?

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-2.4

B. Copy and divide.

1. $126 \div 9$
2. $1805 \div 9$
3. $7\overline{)823}$
4. $52\overline{)78469}$

C. Copy and divide.

1. $100 \div 12$
2. $142130 \div 362$
3. $1000 \div 2$
4. $42\overline{)84056}$

D. Copy and solve as indicated.

1. Divide 32 by 0.
2. Divide 0 by 32.
3. What is the quotient of 1024 divided by 8?
4. Identify the divisor of 88 divided by 11.

TOPIC 60-2.5

ORDER OF OPERATIONS

OBJECTIVE:

● To perform the four fundamental operations in the correct order.

Example: $3 \times 6 + 4 \div 2 - 5 = 15$

A. Copy and perform the indicated operations.

1. $4 \times 3 + 2$
2. $5 \times 2 - 4 \div 4$
3. $8 \times 2 \div 4 + 1$
4. $8 + 6 \times 2 - 10 + 3 \times 3$

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-2.5

B. Copy and perform the indicated operations.

1. $3 + 4 \times 2$
2. $6 - 8 \div 4$
3. $2 \times 5 - 9 \div 3$
4. $5 \div 5 + 6 - 4 \div 2$

C. Copy and perform the indicated operations.

1. $4 + 3 \times 4 \div 4 - 6$
2. $6 \times 4 - 8 \times 2 + 6 \div 3$
3. $6 \times 8 \div 2 + 6 \div 2 \times 8 \div 2$
4. $8 + 3 \times 2 - 14 \div 2 - 7$

TOPIC 60-3.1

DECIMAL FRACTIONS: ROUNDING OFF

OBJECTIVE:

- To round decimals to any desired accuracy.

  Example: Round 2.5175 to the nearest thousandth.

  2.5175 = 2.518

A. Copy and round to the indicated decimal place.

1. 1.5619 to the nearest tenth.
2. 0.4149 to the nearest hundredth.
3. 2.54564 to the nearest ten-thousandth.
4. 1.0609 to the nearest thousandth.
5. 13.65786 to the nearest ten-thousandth.

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-3.1

B. Copy and round to the nearest tenth.

1. 1.64
2. 2.9687
3. 1.06
4. 3.009

C. Copy and round to the nearest hundredth.

1. 1.64
2. 16.4646
3. 1.074
4. 3.009

D. Copy and round to the nearest thousandth.

1. 1.64
2. 16.4646
3. 1.0744
4. 3.0009

E. Copy and round to the nearest ten-thousandth

1. 1.64
2. 16.464646.
3. 1.07544
4. 3.00009

TOPIC 60-3.2

DECIMALS: ADDITION

OBJECTIVE:

- To add decimal fractions.

  Example: 1.32 + 10.1 + 3.4602 = 14.8802

A. Copy and solve.

1. 3.002 + 3.02 + 3.0002 + 3.2
2. 1.94 + 22.86 + .3094
3. .0002 + .001 + 10.002
4. 8674.1 + 32.984 + 2.32961

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-3.2

B. Copy and add.

1. 1.423 + 10.514 + 19.3
2. 10.423 + 10.5 + 342.6
3. 8.006 + 5.99 + .67892
4. 31.8579 + 11.264 + 32.79

C. Copy and add.

1. 1.423 + 10.005 + 19.3 + .142
2. 7.456 + .923 + 1.04 + 7.3
3. 345.24 + 34.624 + 3.4624 + .34524
4. 5.6 + .56 + .056 + .0056 + .00056

TOPIC 60-3.3

DECIMALS: SUBTRACTION

OBJECTIVE:

- To subtract decimal fractions.

  Example: 3.025 - 1.9863 = 1.0387

A. Copy and solve.

1. 89.206 - 42.94
2. 39.4 - 21.006
3. 3.4897 - 1.1635
4. .86 - .0034

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-3.3

B. Copy and subtract.

1. 3.1 - 2.1
2. 3.1 - .21
3. 3.1 - .021
4. 13.87 - 2.6

C. Copy and subtract.

1. 19.002 - 19.0002
2. 2.7615 - 1.4102
3. .84 - .4604
4. 846.23 - 46.023

TOPIC 60-3.4

DECIMALS: MULTIPLICATION

OBJECTIVES:

- To multiply decimals.
- To determine the correct position of the decimal point in the product.

Example: $1.5 \times 2.1 = 3.15$

A. Copy and solve.

1. 1.1×2.3
2. $.6 \times .35$
3. 2.05×4.7
4. $.04 \times .02$

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-3.4

B. Copy and place the decimal point in the given products.

1.	2.	3.	4.
25	.025	2.5	.25
×1.8	× 18	×1.8	×1.8
450	450	450	450

C. Copy and find the products.

1.	2.	3.	4.
1800.3	24.9	7.98	5.21
× 5	×10.6	× 3.8	×2.004

D. Copy and find the products.

1. $2 \times 0.3 \times 1.1$
2. $3 \times 0.1 \times 0.01$
3. $0.5 \times 2.5 \times 0.01$
4. $1.5 \times 0.2 \times 0.005$

TOPIC 60-3.5

DECIMALS: DIVISION

OBJECTIVES:

- To divide decimals.

  Example: $.5\overline{)6} = 12$

- To round the quotient to the desired accuracy.

A. Copy and divide. Round to the specified number of decimal places.

1. $.36\overline{)69.74}$ to tenths
2. $1.9\overline{)2.07}$ to hundredths
3. $47\overline{)10.43}$ to hundredths
4. $1.3\overline{)3.19}$ to tenths

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-3.5

B. Copy and round to the specified number of decimal places.

1. 3.847 to tenths
2. 3.847 to hundredths
3. 0.083 to tenths
4. 0.7749 to hundredths

C. Copy and divide.

1. $1.4\overline{).28}$
2. $.07\overline{)5.6}$
3. $.56\overline{)1.12}$
4. $.7\overline{).63}$

TOPIC 60-3.6

SCIENTIFIC NOTATION

OBJECTIVE:

● To write a mixed decimal and/or a decimal equivalent in scientific notation.

Example: $560 = 5.60 \times 10^2$

A. Copy and write in scientific notation.

1. 1.2
2. 0.12
3. 0.000542
4. 0.00000617

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-3.6

B. Copy and write in scientific notation.

1. .12
2. 10.2
3. 0.26
4. 0.075

C. Copy and write in scientific notation.

1. 0.021
2. 0.00045
3. 0.0021
4. 0.0000054

TOPIC 60-4.1

PRIME AND COMPOSITE NUMBERS

OBJECTIVES:

- To determine prime numbers.
- To determine composite numbers and express as a product of prime factors.

A. Copy and complete as indicated.

1. Copy and circle the prime numbers.

   8 9 10 11 21 23 25 26 28 29

2. Copy and circle the composite numbers.

   31 32 33 34 35 36 37 38 39 40

3. Copy and circle the prime numbers.

   41 42 43 44 45 46 47 48 49 50

4. List the prime numbers between 80 and 100.

5. List the composite numbers between 80 and 100.

6. Write 3900 as a product of prime factors.

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-4.1

B. Copy and classify each as a prime or composite number.

1. 6	2. 99
3. 18	4. 126
5. 27	6. 331
7. 37	8. 501
9. 51	10. 2
11. 77	12. 3238

C. Complete as indicated.

1. List all prime numbers between 30 and 50.
2. List all composite numbers between 20 and 41.
3. List all the even prime numbers.
4. List all whole numbers that are neither prime or composite.

TOPIC 60-4.2

INTRODUCTION TO FRACTIONS

OBJECTIVES:

- To identify proper fractions, improper fractions, and mixed numbers.
- To identify the numerator and denominator of a fraction.
- To change a mixed number into an improper fraction.

A. Copy and complete the following statement with a word or phrase from this list: numerator, denominator, proper fraction, improper fraction, mixed number.

1. Given the fraction $\frac{18}{19}$:

   a. 19 is a(n) ___?___.

   b. 18 is a(n) ___?___.

   c. $\frac{18}{19}$ is a(n) ___?___.

2. Given the fractions $\frac{22}{7} = 3\frac{1}{7}$:

   a. 22 is a(n) ___?___.

   b. $3\frac{1}{7}$ is a(n) ___?___.

   c. 7 is a(n) ___?___.

   d. $\frac{22}{7}$ is a(n) ___?___.

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-4.2

B. Copy and complete the following statement.

1. $\frac{8}{4}$ means $\frac{?}{?}$.

2. $\frac{17}{5}$ means $\frac{?}{?}$.

3. $2\frac{5}{8} = \frac{21}{8}$ because $2 = \frac{?}{8}$ and $\frac{?}{8} + \frac{5}{8} = \frac{21}{8}$.

TOPIC 60-4.3

LEAST COMMON MULTIPLE AND GREATEST COMMON DIVISOR

OBJECTIVES:

- To find the least common multiple of two or more numbers by using prime factors.
- To find the greatest common divisor of two or more numbers by using prime factors.
- To find the lowest common denominator of a set of fractions.

A. Copy and perform the indicated operations.

1. Find the lowest common multiple (L.C.M.) of these numbers.

   18 12 20

2. Find the lowest common denominator (L.C.D.) of these fractions.

   $\frac{3}{14}$ $\frac{1}{20}$ $\frac{9}{35}$

3. Find the greatest common divisor (G.C.D.) of these numbers.

   33 24 45

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-4.3

B. Copy and write each of the following as a product of prime factors.

1. 80 2. 144 3. 210

C. Copy and indicate the value of the following.

If $30 = 2 \cdot 3 \cdot 5$,

and $36 = 2 \cdot 2 \cdot 3 \cdot 3$,

and $45 = 3 \cdot 3 \cdot 5$,

then the L.C.M. is __?__, and the G.C.D. is __?__.

TOPIC 60-4.4

ORDERING OF FRACTIONS

OBJECTIVES:

- To classify fractions in increasing order.

  Example: Order $\frac{3}{5}$, $\frac{1}{2}$, $\frac{2}{3}$.

  Solution: $\frac{1}{2} < \frac{3}{5} < \frac{2}{3}$

- To compare fractions and represent as "greater than", "equal to", or "less than".

  Example: Represent "$\frac{1}{9}$ is less than $\frac{1}{8}$" with symbols.

  Solution: $\frac{1}{9} < \frac{1}{8}$

- To write a fraction as an equivalent fraction.

  Example: $\frac{4}{5} = \frac{?}{80}$

  Solution: $\frac{4}{5} = \frac{64}{80}$

TOPIC 60-4.4

A. Copy and solve.

1. Write these fractions in ascending order.

$\frac{3}{4}$ $\frac{1}{6}$ $\frac{2}{3}$

2. Which is the largest fraction?

$\frac{2}{9}$ $\frac{17}{54}$ $\frac{9}{27}$

3. If one route taken to the store uses $\frac{5}{6}$ gallon of gas and another route uses $\frac{13}{16}$ gallons, which route uses less gas?

4. Write the symbols: <, >, =, in the blank that will make the statement true.

a. $\frac{8}{3}$ ___ $\frac{64}{24}$ b. $\frac{13}{18}$ ___ $\frac{6}{9}$ c. $\frac{4}{15}$ ___ $\frac{5}{21}$

5. Change these pairs of fractions to equivalent fractions having the given denominator.

a. $\frac{3}{7} - \frac{?}{56}$ b. $\frac{1}{8} - \frac{?}{56}$

c. $\frac{11}{24} - \frac{?}{24}$ d. $\frac{7}{6} - \frac{?}{24}$

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-4.5

FRACTIONS: ADDITION

OBJECTIVE:

- To add fractions and mixed numbers.

A. Copy and add (reduce answers to lowest terms).

1. $\begin{array}{r} \frac{5}{7} \\ + \\ \frac{2}{7} \\ \hline \end{array}$

2. $\begin{array}{r} \frac{7}{12} \\ + \\ \frac{5}{6} \\ \hline \end{array}$

3. $4\frac{2}{3} + 5\frac{5}{8}$

4. Find the sum of $20\frac{13}{14}$, $8\frac{4}{21}$, $12\frac{7}{12}$.

5. George and Maria were timing three records, and they found that one recore played $3\frac{1}{4}$ minutes, another played $4\frac{1}{2}$ minutes, and the other played for $5\frac{1}{3}$ minutes. How long did it take to play all three records?

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

B. Copy and find the lowest common denominator (L.C.D.) of the given fractions.

1. $\frac{5}{6}, \frac{3}{4}, \frac{11}{12}$
2. $\frac{7}{8}, \frac{9}{10}, \frac{1}{12}$
3. $\frac{3}{7}, \frac{8}{91}, \frac{5}{13}$
4. $\frac{5}{12}, \frac{7}{16}, \frac{11}{18}$

C. Copy and change to equivalent fractions with the specified denominators.

1. $\frac{3}{25} = \frac{?}{100}$
2. $\frac{4}{13} = \frac{?}{64}$
3. $\frac{8}{15} = \frac{?}{75}$
4. $\frac{7}{8} = \frac{?}{64}$

D. Copy and reduce to lowest terms.

1. $\frac{45}{24}$
2. $\frac{27}{81}$
3. $\frac{3500}{5000}$
4. $\frac{34}{119}$

E. Copy and indicate as true or false.

1. $\frac{3}{7} + \frac{2}{7} = \frac{5}{14}$
2. $\frac{4}{9} + \frac{1}{9} = \frac{5}{9}$
3. $\frac{2}{3} + \frac{1}{2} = \frac{3}{5}$
4. $20 + \frac{3}{8} = \frac{163}{8}$

TOPIC 60-4.6

FRACTIONS: SUBTRACTION

OBJECTIVE:

- To subtract fractions and mixed numbers.

A. Copy and perform the indicated operations.

1. $8\frac{3}{4} - 5\frac{1}{2}$

2. $10\frac{2}{9} - 7\frac{5}{6}$

3. $285\frac{1}{15} - 197\frac{7}{20}$

4. Subtract $14\frac{3}{8}$ from 20.

5. A man can do a certain job in $7\frac{1}{2}$ hours. A machine can do the same job in $2\frac{2}{3}$ hours. How much time can be saved by using the machine on the job?

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-4.6

B. Copy and find the lowest common denominator (L.C.D.) of the given fractions.

1. $\frac{2}{5}, \frac{3}{8}, \frac{7}{10}$

2. $\frac{4}{7}, \frac{1}{4}, \frac{3}{14}$

3. $\frac{2}{9}, \frac{7}{54}, \frac{2}{3}$

4. $\frac{1}{51}, \frac{2}{3}, \frac{3}{34}$

C. Copy and change the given fractions to an equivalent with the indicated denominator.

1. $\frac{8}{15} = \frac{?}{45}$

2. $\frac{29}{100} = \frac{?}{1000}$

3. $\frac{16}{25} = \frac{?}{75}$

4. $\frac{8}{19} = \frac{?}{76}$

D. Copy and find the missing numbers.

1. $5 = 4\frac{?}{3}$

2. $8\frac{2}{3} = 7\frac{?}{3}$

3. $15 = 14\frac{?}{7}$

4. $29\frac{1}{5} = 28\frac{?}{15}$

E. Copy and indicate as true or false.

1. $\frac{8}{9} - \frac{1}{9} = \frac{7}{9}$

2. $\frac{15}{19} - \frac{11}{11} = \frac{4}{7}$

3. $20 - 8\frac{4}{5} = 12\frac{4}{5}$

4. $18\frac{1}{5} - 2\frac{4}{5} = 15\frac{2}{5}$

TOPIC 60-4.7

FRACTIONS: MULTIPLICATION

OBJECTIVES:

- To change mixed numbers to improper fractions.
- To multiply a fraction, mixed number, or whole number by a fraction, mixed number, or whole number.

A. Copy and multiply (reduce answers to lowest terms).

1. $1\frac{5}{12} \times 8$

2. $\frac{8}{15} \times \frac{4}{7} \times \frac{5}{16}$

3. $24 \times 6\frac{3}{8}$

4. Find the product of $12\frac{3}{8}$ and $10\frac{2}{11}$.

5. If it takes $12\frac{1}{2}$ minutes to walk one mile, how many minutes would it take to walk 8 miles at the same rate?

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-4.7

B. Copy and change the following mixed numbers to improper fractions.

1. $5\frac{7}{8}$

2. $3\frac{2}{5}$

3. $10\frac{5}{6}$

4. $18\frac{2}{7}$

C. Copy and find the missing number.

1. $\overset{1}{\cancel{4}}{}_{\cancel{7}} \times \frac{14}{9}$?

2. $\overset{2}{18}{}_{11} \times \frac{4}{\cancel{9}}$?

3. $\overset{1}{21}{}_{\cancel{7}} \times \frac{8}{5}$

4. $\overset{1}{29}{}_{\cancel{3}} \times \frac{\cancel{9}}{5} \times \frac{7}{58}$?

D. Copy and indicate as true or false.

1. $\frac{2}{3} \times \frac{7}{9} = \frac{14}{27}$

2. $4 \times \frac{7}{8} = \frac{28}{32}$

3. $\frac{10}{7} \times \frac{1}{10} = 7$

4. $\frac{8}{3} \times \frac{2}{3} = \frac{16}{9}$

TOPIC 60-4.8

FRACTIONS: DIVISION

OBJECTIVE:

● To divide a fraction, mixed number, or whole number by a fraction, mixed number, or whole number.

A. Copy and divide (reduce answers to lowest terms).

1. $\frac{3}{8} \div \frac{5}{16}$

2. $18 \div 3\frac{3}{7}$

3. $13\frac{1}{5} \div 11$

4. Simplify: $\dfrac{\frac{2}{3}}{\frac{4}{5}}$

5. How many pieces of cloth measuring $1\frac{1}{3}$ ft. could be cut from a bolt of material 32 ft. long?

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-4.8

B. Copy and change the following mixed numbers to improper fractions.

1. $4\frac{2}{7}$

2. $18\frac{1}{3}$

3. $5\frac{7}{9}$

4. $102\frac{4}{5}$

C. Copy and indicate as true or false.

1. $\frac{3}{5}$ means $3 \div 5$.

2. $\frac{\frac{2}{9}}{\frac{3}{8}}$ means $\frac{2}{9} \div \frac{3}{8}$.

3. $\frac{1}{2} \div \frac{7}{9} = \frac{1}{2} \times \frac{9}{7}$

4. $\frac{1}{2} \div \frac{7}{9} = \frac{2}{1} \times \frac{7}{9}$

TOPIC 60-5.1

RATIO

OBJECTIVE:

● To write a ratio in reduced form, when given appropriate information.

Example: 6 is to 4 = $\frac{3}{2}$

A. Copy and write as a ratio.

1. 6 inches to 1 foot.
2. 7.5 to 22.5
3. 273 to 351
4. 75 hits to 200 times at bat (in baseball)
5. 15 $\frac{1}{2}$ hours to 77 $\frac{1}{2}$ hours
6. 36 gallons to 240 miles
7. Write a ratio of 10 card tables to 40 chairs.

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-5.1

B. Copy and write as a ratio.

1. 3 to 9
2. $4\frac{1}{2}$ to $13\frac{1}{2}$
3. 2.6 to 15.6
4. 8 to 32
5. 155 to 117

C. Copy and write as a ratio.

1. 2 inches to 1 foot
2. $4\frac{1}{2}$ gallons to 16 families
3. 56 radios to 16 families
4. 50 cents to $3

TOPIC 60-5.2

PROPORTION

OBJECTIVE:

- To state and solve proportions.

A. Copy and determine the missing terms.

1. 1 is to 2 as 3 is to ___?___.
2. $1\frac{1}{2}$ is to 4 as ___?___ is to 8.
3. 6.4 is to ___?___ as 7 is to 15.
4. If 2 bars of soap cost 46¢, how much will 5 bars of soap cost?
5. If 3 pencils cost 48¢, how many pencils can be purchased for $2.40?

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPEC 60-5.2

B. Copy and determine the missing term.

1. 3 is to 4 as 6 is to ___?___
2. 3 is to ___?___ as 8 is to 10
3. ___?___ is to $2\frac{1}{2}$ as 6 is to 9
4. 3.5 is to 4.6 as 7.8 is to ___?___

C. Copy and answer the following.

1. There are 36 girls in a class of 78 students. What is the ratio of boys to the class?
2. If a gallon and a half of gasoline cost 75¢, how many gallons can be purchases for $3.25?
3. If a quart of milk costs 40¢. What is the cost of a pint and a half of milk? (one quart = two pints)
4. If a six foot stick (standing upright) casts a shadow of 4'6", and a tree casts a show of 25 feet, what is the height of the tree?

TOPIC 60-6.1

PERCENT: RELATIONSHIP TO DECIMAL FRACTIONS

OBJECTIVES:

- To change a percent to a decimal fraction.

  Example: 5% = .05

- To change a decimal fraction to a percent.

  Example: 2.52 = 252%

A. Copy and perform the indicated operations.

1. Change 80% to a decimal fraction.
2. Change 1.00 to a percent.
3. Change 565% to a decimal fraction.
4. Change 46 to a percent.
5. Change $\frac{1}{2}$ % to a decimal fraction.

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-6.1

B. Copy and write as percents.

1. .125
2. 1.25
3. .0125
4. 400

C. Copy and write as decimal fractions.

1. 148.63%
2. $\frac{1}{8}$%
3. .3%
4. .475%

D. Copy and write as indicated.

1. 23.6% as a decimal fraction.
2. 1.4863 as a percent.
3. 150% as a decimal fraction.
4. 375 as a percent.

TOPIC 60-6.2

PERCENT: RELATIONSHIP TO COMMON FRACTIONS

OBJECTIVES:

- To change a percent to a common fraction.

  Example: $75\% = \frac{3}{4}$

- To change a common fraction to a percent.

  Example: $\frac{1}{3} = 33\frac{1}{3}\%$

A. Copy and perform the indicated operations.

1. Change 80% to a common fraction.
2. Change $\frac{3}{5}\%$ to a common fraction.
3. Change $\frac{3}{5}$ to a percent.
4. Change $3\frac{3}{4}\%$ to a common fraction.
5. Change $\frac{5}{8}$ to a percent.

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-6.2

B. Copy and change to percents.

1. $\frac{7}{100}$

2. $\frac{5}{6}$

3. $\frac{124}{200}$

4. $2\frac{1}{8}$

C. Copy and change to common fractions.

1. $66\frac{2}{3}\%$

2. $88\frac{8}{9}\%$

3. 40%

4. 325%

D. Copy and change as indicated.

1. Write $\frac{9}{100}$ as a percent.

2. Write $2\frac{1}{2}\%$ as a fraction.

3. Write $\frac{6}{7}$ as a percent.

4. Write $\frac{3}{4}\%$ as a fraction.

TOPIC 60-6.3

PERCENT: APPLICATIONS

OBJECTIVE:

- To solve problems involving percent.

  Example: 10% of 30 is 3

  Example: 15 is 25% of 60

  Example: 50% of 120 is 60

A. Copy and work the following.

1. Find 14% of 83.
2. What percent of 8 is 6?
3. Find 3% of $7.28.
4. 8% of what number is 32?
5. What is $12\frac{1}{2}$% of 50?

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-6.3

B. Copy and work the following.

1. Find 100% of 35.
2. Find 10% of $10.00.
3. Find 45% of 900.
4. Find .04% of 350.

D. Copy and work the following.

1. What percent of 10 is 5?
2. What percent of 5 is 10?
3. What percent of 50 is 60?
4. What percent of 200 is 38?

D. Copy and work the following.

1 300% of what number is 150?
2. 3.6% of what number is 40?
3. 1 % of what number is 68?
4. 6.75% of what number is $480?

TOPIC 60-7.1

POWERS OF NUMBERS

OBJECTIVES:

- To evaluate powers of numbers.

  Example: $3^3 = 3 \times 3 \times 3 = 27$

A. Copy and evaluate.

1. 6^2	2. 2^5
3. 5^3	4. 10^4
5. $3^2 + 2^3$	6. $.1^2$
7. $\left(\frac{5}{7}\right)^2$	8. $\left(\frac{2}{3}\right)^4$
9. $(.04)^3$	10. $(1.05)^2$

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-7.1

B. Copy and evaluate as indicated.

1. 0^3
2. 25^2
3. $(1.2)^2$
4. $(.1)^6$
5. $\left(\frac{9}{10}\right)^2$

C. Copy and evaluate as indicated.

1. 30^3
2. $2^4 \times 3^2$
3. $1^9 + 10^2$
4. $10^4 \times 0^5$
5. $16^2 \div 8^2$

D. Copy and do the following.

1. Write in exponential form : $3 \times 3 \times 2 \times 2 \times 2$
2. Write the expression: "ten to the fifth power", using exponents.
3. Write in exponential form: $4 \times 4 + 5 \times 5 \times 5$
4. Express 10,000,000 as a power of 10.

TOPIC 60-7.2

PERFECT SQUARES

OBJECTIVES:

- To recognize perfect squares through 400.

  Example: 361 is a perfect square because $19^2 = 361$.

- To find the square root of a perfect square less than or equal to 400.

  Example: $\sqrt{361} = 19$

A. Copy and do the following.

1. Circle the perfect squares.

   1 4 8 16 36 60 100 116

2. Write symbolically the expression "square root of 25 is 5".
3. What is the square root of 1?
4. $\sqrt{400} =$?
5. $\sqrt{2.25} =$?

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-7.2

B. Copy and express as indicated.

1. Write the perfect squares from 1 to 50.
2. Write the expression: "square root of 81".
3. What is the square root of 169?
4. What is the square root of 0?

C. Copy and evaluate.

1. $\sqrt{100}$
2. $\sqrt{144}$
3. $\sqrt{225}$

TOPIC 60-7.3

USE OF TABLES

OBJECTIVE:

- To read tables of squares and square roots of integers.

FIGURE 60-7.3-1

TABLE OF SQUARES AND SQUARE ROOTS

Number	Square	Square Root	Number	Square	Square Root
1	1	1.000	11	121	3.317
2	4	1.414	12	144	3.464
3	9	1.732	13	169	3.606
4	16	2.000	14	196	3.742
5	25	2.236	15	225	3.873
6	36	2.449	16	256	4.000
7	49	2.646	17	289	4.123
8	64	2.848	18	324	4.243
9	81	3.000	19	361	4.359
10	100	3.162	20	400	4.472

TOPIC 60-7.3

A. Using the Table of Squares and Square Roots (Figure 60-7.4-1), copy and work the following.

1. Find the square of 17.
2. Find the square root of 361.
3. Find the square root of 13.
4. Find the square root of 12 to the nearest tenth.

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

B. Copy and find the square of each (use Figure 60-7.4-1).

1. 5
2. 14
3. 18
4. 11

C. Copy and find the square root of each (use Figure 60-7.4-1).

1. 3
2. 20
3. 14
4. 1

D. Copy and work as indicated (use Figure 60-7.4-1).

1. Find the square root of 196.
2. Find the square root of 12 to the nearest tenth.
3. Find the square root of 18 to the nearest hundredth.

TOPIC 60-8.2

METRIC: LENGTH

OBJECTIVE:

- To make linear metric conversions.

A. Copy and make the following conversions.

1. 1 meter (m.) = ___?___ centimeters (cm.)
2. 2.5 kilometers (km.) = ___?___ meters (m.)
3. 1 hectometer (hm.) = ___?___ meters (m.)
4. 120 millimeters (mm.) = ___?___ centimeters (cm.)
5. 2 dekameters (dam. or dkm.) = ___?___ decimeters (dm.)

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-8.2

B. Copy and make the following conversions.

1. 1000 millimeters = ___?___ meters
2. 100 centimeters = ___?___ meters
3. 10 decimeters = ___?___ meters
4. 10 dekameters = ___?___ meters
5. 100 hectometers = ___?___ meters
6. 1000 kilometers = ___?___ meters

TOPIC 60-8.3

METRIC: VOLUME (CAPACITY)

OBJECTIVE:

- To make volumetric conversions.

A. Copy and make the following conversions.

1. 1000 milliliters = __?__ liters.
2. 100 centiliters = __?__ liters.
3. 10 deciliters = __?__ liters.
4. 1 dekaliter = __?__ liters.
5. 10 hectoliters = __?__ liters.
6. 1 kiloliter = __?__ liters.

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-8.4

METRIC: MASS

OBJECTIVE:

- To make metric mass conversions.

A. Copy and determine answer.

1. 1 kilogram = ___?___ grams.
2. 25 milligrams = ___?___ grams.
3. 2.6 dg. minus 2.6 grams = ___?___ grams.
4. 1.5 kg. + 1.2 hg. = ___?___ grams
5. 18 kg. ÷ 3 = ___?___ grams.
6. 15 mg. × 20 = ___?___ cg.

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-8.5

METRIC: AREA

OBJECTIVE:

● To find the area and dimensions of a geometric figure in metric measure given appropriate information.

A. Copy and determine the answer.

1. A square's side measures 1.5 meters. Find the area.
2. A circle's radius is 1.5 cm. Find the area.
3. A rectangle's width is 7.5 decimeters and its length is 1.2 meters. Find the area.
4. A television station can televise programs for a distance of 60 linear miles in all directions. What area in square kilometers does it cover?

➡ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 60-8.5

B. Find the areas of:

1. A square with a side of 2.5 dm.
2. A rectangle 2.5 m. by 3.2 m.
3. A circle with a diameter of 2 m.
4. A rectangle 5 dekameters by 25 centimeters.

C. Copy and find the areas of these rectangles.

1. 3.6 meters by 15 decimeters.
2. 812 millimeters by 22 centimeters.
3. 2.5 kilometers by 55 meters.
4. 2.5 hectometers by 150 decimeters.

D. Write the formula for the area of each of the following.

1. Rectangle
2. Circle